DESIGN OF SCORE ADMINISTRATION PROGRAM FOR LECTURER IN UNIVERSITAS MUHAMMADIYAH SURAKARTA BASED ON SINGLE PAGE APPLICATION

This Final Project Compiled as a Condition to Complete Bachelor Degree Program at the Informatics Department Faculty of Communication and Information

Submitted by:

IIN SILVIYA INAYATI

L 200 122 008

INFORMATICS DEPARTMENT

FACULTY OF COMMUNICATION AND INFORMATION

UNIVERSITAS MUHAMMADIYAH SURAKARTA

2016

APPROVAL PAGE

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SCIENTIFIC PUBLICATION

By:

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L 200 122 008

have been inspected and approved to be tested by :

Supervisor

(Bana Handaga, Dr. Ir, MT)

NIK: 793

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Has been well sustained in front of examiners
Faculty of Communication and Informatics
Universitas Muhammadiyah Surakarta
Day ...15th July..... 2016
and has been proven to be qualified

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   (Member 1 of examiners)
3. **Muhammad Kusban, S. T, M.T** (.....)
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Author

IIN SILVIYA INAYATI

L 200 122 008

UNIVERSITAS MUHAMMADIYAH SURAKARTA
FAKULTAS KOMUNIKASI DAN INFORMATIKA
PROGRAM STUDI INFORMATIKA
Jl. A Yani Tromol Pos 1 Pabelan Kartasura Telp. (0271)717417, 719483 Fax (0271) 714448
Surakarta 57102 Indonesia. Web: http://informatika.ums.ac.id. Email: informatika@ums.ac.id

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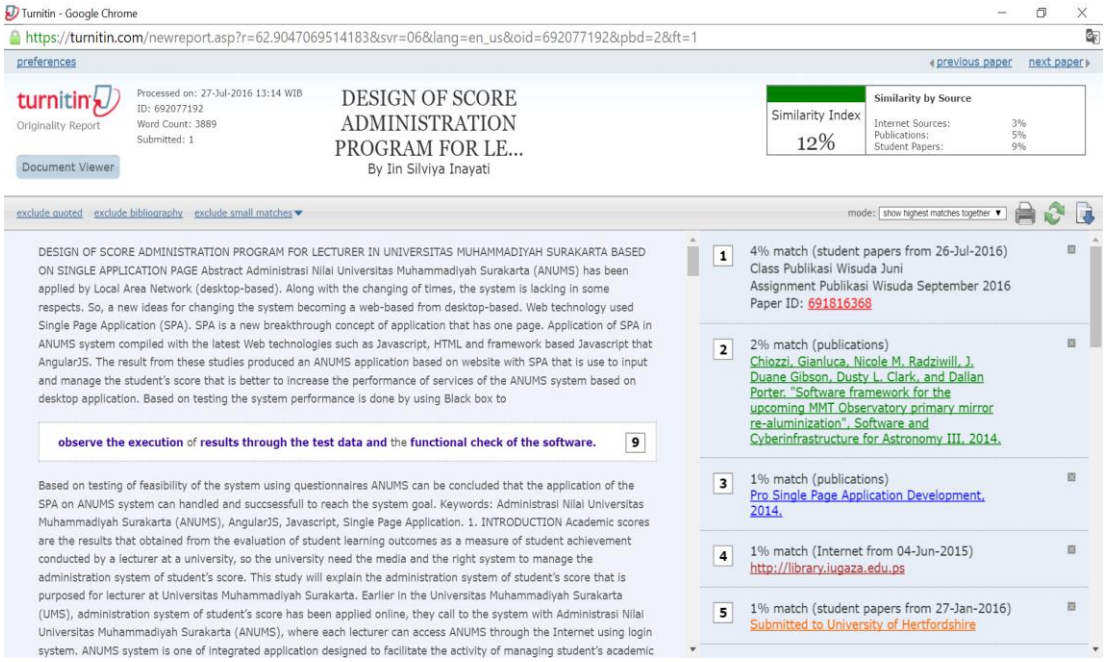
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observe the execution of results through the test data and the functional check of the software. 9
Based on testing of feasibility of the system using questionnaires ANUMS can be concluded that the application of the SPA on ANUMS system can handled and succsessfull to reach the system goal. Keywords: Administrasi Nilai Universitas Muhammadiyah Surakarta (ANUMS), AngularJS, Javascript, Single Page Application. 1. INTRODUCTION Academic scores are the results that obtained from the evaluation of student learning outcomes as a measure of student achievement conducted by a lecturer at a university, so the university need the media and the right system to manage the administration system of student's score. This study will explain the administration system of student's score that is purposed for lecturer at Universitas Muhammadiyah Surakarta. Earlier in the Universitas Muhammadiyah Surakarta (UMS), administration system of student's score has been applied online, they call to the system with Administrasi Nilai Universitas Muhammadiyah Surakarta (ANUMS), where each lecturer can access ANUMS through the Internet using login system. ANUMS system is one of integrated application designed to facilitate the activity of managing student's academic
1 4% match (student papers from 26-Jul-2016)
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DESIGN OF SCORE ADMINISTRATION PROGRAM FOR LECTURER IN UNIVERSITAS MUHAMMADIYAH SURAKARTA BASED ON SINGLE APPLICATION PAGE

Abstract

Administrasi Nilai Universitas Muhammadiyah Surakarta(ANUMS) has been applied by Local Area Network (desktop-based). Along with the changing of times, the system is lacking in some respects. So, a new ideas for changing the system becoming a web-based from desktop-based. Web technology used Single Page Application (SPA). SPA is a new breakthrough concept of application that has one page. Application of SPA in ANUMS system compiled with the latest Web technologies such as Javascript, HTML and framework basedJavascript that AngularJS. The result from these studies produced an ANUMS application based on website with SPA that is use to input and manage the student's score that is better to increase the performance of services of the ANUMS system based on desktop application.Based on testing the system performance is done by using Black box to observe the execution of results through the test data and the functional check of the software. Based on testing of feasibility of the system using questionnaires ANUMS can be concluded that the application of the SPA on ANUMS system can handled and succsessfull to reach the system goal.

Keywords: *Administrasi Nilai Universitas Muhammadiyah Surakarta*(ANUMS), AngularJS, Javascript, Single Page Application.

1. INTRODUCTION

Academic scores are the results that obtained from the evaluation of student learning outcomes as a measure of student achievement conducted by a lecturer at a university, so the university need the media and the right system to manage the administration system of student's score. This study will explain the administration system of student's score that is purposed for lecturer at UniversitasMuhammadiyah Surakarta. Earlier in the UniversitasMuhammadiyah Surakarta (UMS), administration system of student's score has been applied online, they call to the system with *AdministrasiNilaiUniversitasMuhammadiyah Surakarta* (ANUMS), where each lecturer can access ANUMS through the Internet using login system. ANUMS system is one of integrated application designed to facilitate the activity of managing student's academic score. However, to access this ANUMS system, lecturers must install first the application of ANUMS on their desktop. So, it is less efficient than the web-based system that can be accessed directly through their web browser without having to install an ANUMS application as desktop-based. Then with the Single Page Application (SPA) technology, the system can avoid the processes of loading some web pages as done by the multiple page application, so the server must repeatedly send data accessed. Whereas the information needed is not necessarily comparable when accessing the page. This can lead to high data traffic, wasteful of bandwidth and time both from the server and lecturer as clients.

From the problems that outlined above, we need improvement to overcome the problem, one of them is to implement a Single Page Application (SPA) on the ANUMS system. SPA is a web-based application that uses only one page. Even if the user switches to another menu, the URL does not change. The server sends and refresh certain part based on user request that is expected to save bandwidth. Another advantage of SPA is to make the web more responsive to user requests that provided on the web page.

The purpose of this study was to implement a Single Page Application (SPA) on the application of managing student's score. The object of research is ANUMS system that is accessed by a lecturer at Universitas Muhammadiyah Surakarta. Then the benefits of this research is to help and contribute to the university, especially in developing information systems to provide solutions of problems that arise. In addition, this study also as a motivation for all students of informatics in learning the latest web technology in particular of Single Page Application. Benefits for the researchers themselves is to apply the knowledge acquired during lectures and experience because Single Page Application is something new in the world of web programming.

Madhuri A. Jadhav et al (2015) in a paper entitled "Using AngularJS Single Page Application" said that in an era of modern web technologies, most sites use the SPA which is a web application that only requires a single page like any other desktop application. In the SPA, all components such as CSS, images, scripts and other necessary resources are loaded at one time in the main page and then the appropriate content / component loaded dynamically depending on the interaction / user requests. Users who already load pages at the beginning and every request to the site, the site only needs to take a little time because only refresh the particular part or several parts of the whole page. This saves bandwidth and time required. SPA built with AngularJS the frontend its structured into patterns Model, View, Controller and therefore very easy to maintain program code.

Renien John Joseph (2015) in "Single Page Application and Drawing Canvas" said the SPA was built for outreach browser, reducing the loading process, and improve the user experience. SPA is also known as Single-Page Interface. SPA built for their emerging technology, it's called AJAX (Asynchronous JavaScript and XML). SPA consists of individual pages that can be updated independently of any action from the user, so that the entire page does not need to be reloaded as a classic web application.

Michael S. Mikowski and Josh C. Powell (2014) in "Single Page Web Applications" says that preparation for learning about other approaches to develop web, is with Single Page Application (SPA). SPA is a web application that is implemented as a desktop application. The result is a high responsivity experience and pleasure users, do not confuse and annoy users.

Fernando Monteiro (2014) in "Learning Single-Page Web Application Development" said that Single Page Application (SPA) is a web application that is suitable for a single web page with the aim of providing a better user experience fun and the interface is more complete. SPA popularity has increased in the near future, mainly because of its connection to facilitate the developer program. This is because from the beginning, all the work has been completed from start to finish with the use of web technologies such as AJAX, HTML templates, good MVC framework, and use JavaScript much.

David Benge (2015) in "Building Single Page Applications Using AngularJS on AEM" said that an application single page (SPA), is a web application or web site that is suitable for web pages in order to provide a better user experience similar to desktop applications. In the SPA, all of the code such as HTML, JavaScript, and CSS, charged at the beginning of the page, or the right resources are dynamically loaded and added to the page as needed. Usually in response to user actions, the page is not reloaded at any point in the process, nor does it transfer control to another page.

Gil Fink and Ido Flatow (2014) in the "Pro Single Page Application Development: Using Backbone.js and ASP.NET" said the single page application (SPA) is a web application that uses only one web page HTML as the shell for all applications web pages and end-user interaction implemented using JavaScript, HTML, and CSS. Most of the construction of the SPA to do in the beginning as a new competitor of traditional web applications that rely heavily on interaction and the web server to reload every time a new web page navigation occurs. SPA resembles a native application in behavior and development but traditional web applications running in the browser as opposed to the original application, which runs in its own process.

According to Ariyani Ristiyabudi and Husni Thamrin (2016) in their journal research that using Single Page Application can approve the requiring data transfer of applications less than a tenth of use the application without the SPA process. Application with SPA saves the total time that required during the charging process the data to a third of the time that required if the process is done using the application without SPA.

2. METHOD ANDSYSTEM DESIGN

The experimental method used by comparing the system of AdministrasiNilai UMS (ANUMS) based desktop (the current system) with online system of ANUMS with the SPA that was developed specifically for this final project. The time that needed to complete this study approximately five months from February - June 2016, and it’s housed at the UniversitasMuhammadiyah Surakarta Jl.

A. Yani Drum Pos 1 PabelanKartasura. The equipment that are used for the study consists of software and hardware. Software that are used include Sublime Text 2, XAMPP, Google Chrome, and DBDesigner 4. The hardware that are used is a laptop with specs Intel Core i3 processor, 4 GB RAM, 500 GB hard drive and the Windows 10 operating system and smartphone with specifications 8 Core processors 1.5 GHz, 2 GB RAM, 8 GB of ROM and 4 GB external memory. The materials that are used for this study is a score data of active student from Department of Informatics and Communication, UniversitasMuhammadiyah Surakarta.

The system design includes the creation of design by using the diagram in the Unified Modeling Language (UML). Diagram that are used consist of: use case diagrams, class diagrams, and activity diagrams. Use case diagrams describe the functionality that expected of a system. Use case diagram for this system has two user as illustrated in Figure 1. The first user is a lecturer. They can perform multiple activities. Such as login to be able to sign in and access ANUMS system. Afterlogin, lecturers can also perform activities where lecturers can download participant or student assessment form in excel. After the assessment form was downloaded on the campus's PC, lecturers input student's score into that form. Then, after lecturers completing that acitivity, they can upload the file into the ANUMS system to checked or printed when entering the activity checks / print score. The second user is admin. Specialized in this study who act as administrators of the system is PHPMyadmin fromMysql system. However, in the actual system the real admin is Department's staff on each faculty in UMS. Some activities of admin that can do hereare define the semester and profile of lecturer that will access by ANUMS system and perform the activities of check or print the student's scores if necessary. The next class diagram for this system is shown in Figure 2, which can describe the state (attribute / property) of ANUMS systems based website with the SPA, while offering services to manipulate the situation (method / function). Then, Activity Diagram for this system illustrate the workflow or activity of ANUMS system that will be created. The most important thing of activity diagram to describe the activity of system, not the actor's activity. 1) Activity diagram of 'Login' shows the activity when the lecturer will log in to be able to access the ANUMS system. 2) Activity diagram of 'Download Peserta' showed activity when the lecturer will download the form of students' scores in the form of excel then the lecturer inputs the students' scores, as shown in Figure 3.3) Activity diagram of 'Upload Nilai' shows the activity when the lecturer finished inputing student's scores then will be uploaded into ANUMS website. File of studen's score is in excel form, as shown in Figure 4. 4) Activity diagram of 'Ubah Password' shows the activity of lecturer when the lecturer will change his or her password.

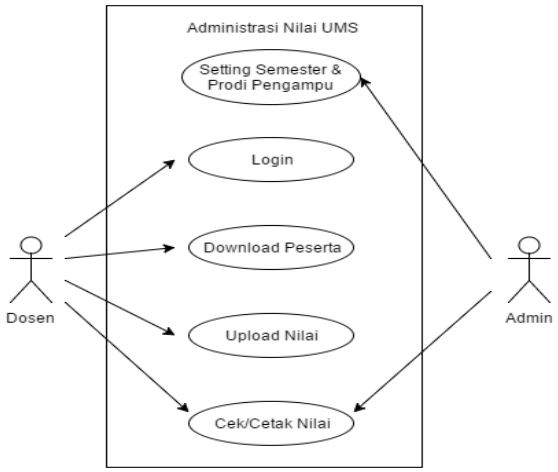


Figure 1. *Use Case Diagram* of ANUMS System

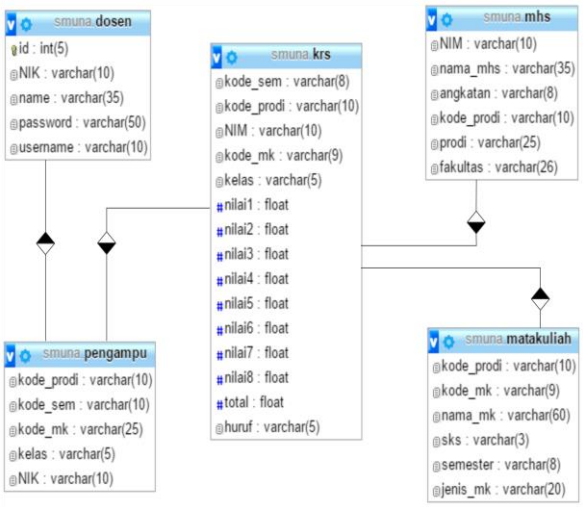


Figure 2. *Class Diagram*of ANUMS system

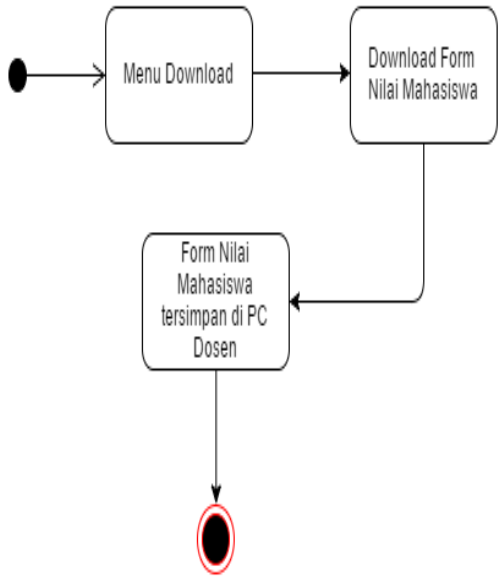


Figure 3. *Activity Diagram* of 'DownloadPeserta'

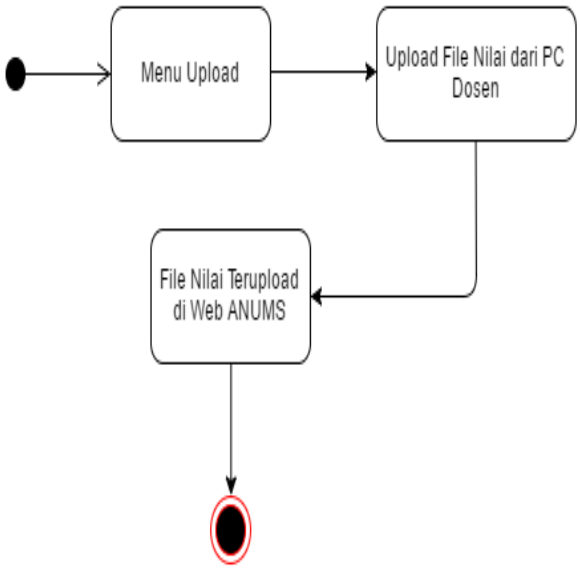
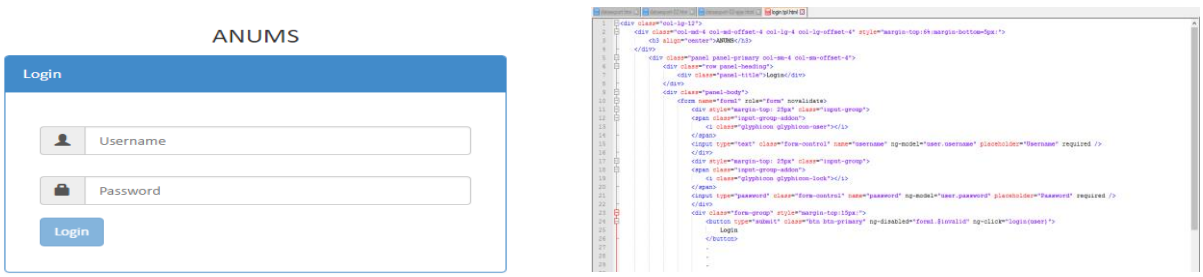


Figure 4. *Activity Diagram*of'Upload Nilai'

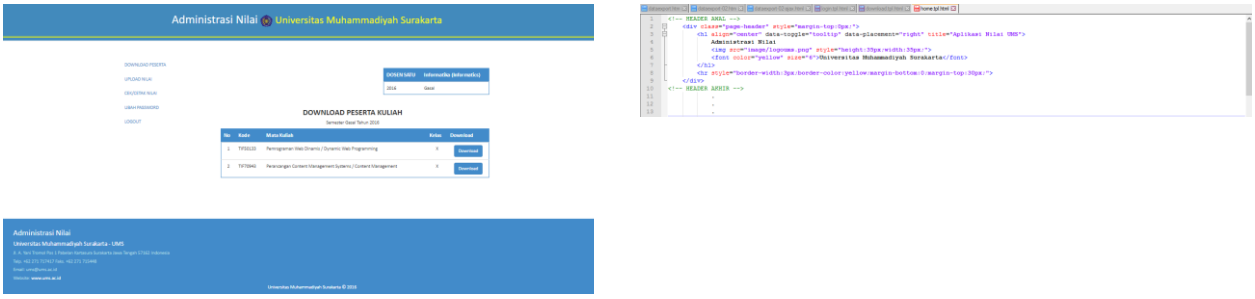
2.1 Implementation

The process of making this system by the authors in implementing the Single Page Application (SPA) on ANUMS system based website contains a single HTML page. So, users can allow dynamically interact with applications when accessing the pages on this system. SPA uses Javascript frameworks, AJAX and HTML5 to create ANUMS and make this application more responsive, without reload this page repeatedly. There are some basic concepts to build the SPA, including the Model-View-Controller (MVC), Model-View-ViewModel (MVVM), data binding and routing. Then, the processes of making on each page in the ANUMS system that suitable with design of ANUMS system which has been described previously. Wherein, the displays of ANUMS system are divided into six views, there are Login view, the main view, 'Download Peserta' view,

‘Upload Nilai’ view, ‘Cek/CetakNilai’view, and ‘Ubah Password’ view. 1) The Login view is a view that appears first when opening ANUMS system. Login display is used to validate the lecturers are allowed and which are not allowed to access the main page. In this view, there is a form that consists of two fields for the input of data, that are username and password, a button to execute the data has entered into the system. 2) Main display of ANUMS is a view that is displayed the first time when the lecturer login successfully. In this view, consists of a header, content and footer. In the header contains the title system, along with the logo and the name of the university. Then at the content is divided into three parts again, there are left part, top right and bottom right. On the left there are some menus of content in this system, namely the ‘DOWNLOAD PESERTA’ Menu, ‘UPLOAD NILAI’ Menu, ‘CEK / CETAKNILAI’ Menu, ‘UBAH PASSWORD’ Menu, and ‘LOGOUT’ Menu. Then at the top right of the content there is the status of lecturers who are accessing the system. After that, in the bottom right is what will change according to the actions taken by the lecturers. 3) Display of ‘Download Peserta’ view is a view when lecturers clicking menu of ‘DOWNLOAD PESERTA’ to download the student’s assessment form in excel file. 4) Display of ‘Upload View’ view are to see when lecturers clicking the menu of ‘UPLOAD NILAI’for uploading an excel form that was inputted student’s score into the ANUMS system. 5) Display of ‘Cek/ CetakNilai’ viewis to see when lecturers clicking the menu of ‘CEK / CETAKNILAI’ to ensure the students' scores have been uploaded into the ANUMS system and print these files into a PDF file. 6) Display of ‘Ubah Password’ view is to see when lecturers clicking the menu of‘UBAH PASSWORD’. In this view, seems like the main display of ANUMS. The difference is in the content section to the bottom right, which displays a form to change the password when logging lecturers. In this form, there are three fields for inputting data of a new password, the old password and username of lecturer, a button to execute the data that entered by the lecturer for processing if passsword has been changed or not.

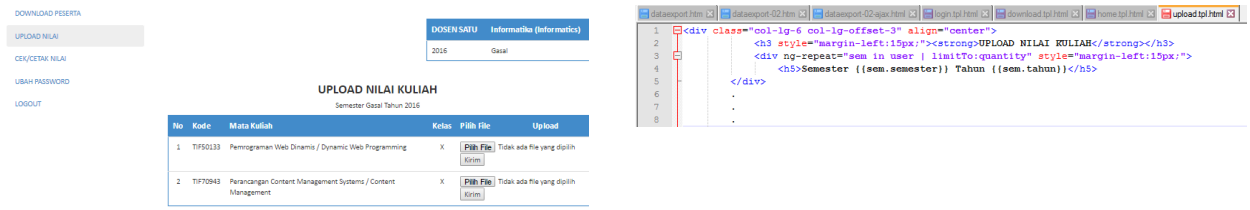


(a) Login Screen

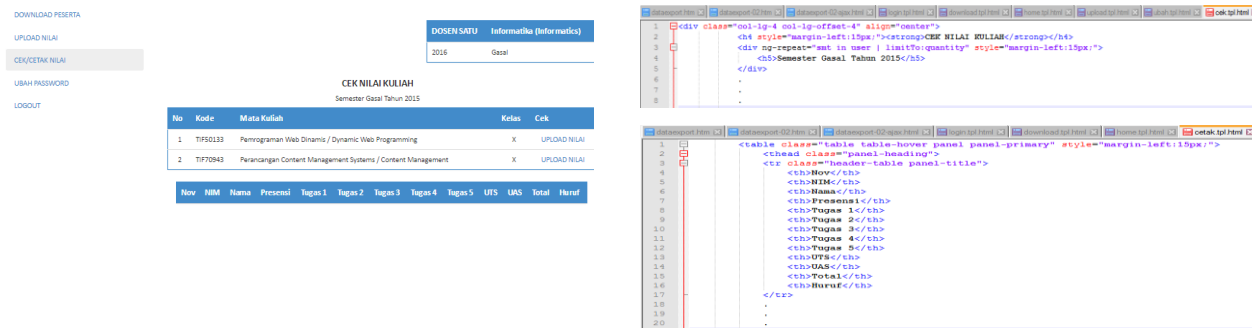


(b) Front Page

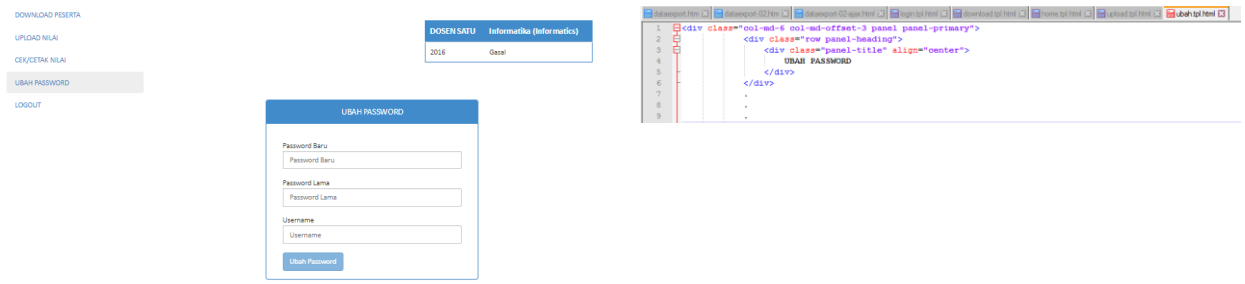
(c) Download Page



(d) Upload Page



(e) ‘Cek/CetakNilai’ Page



(f) ‘Ubah Password’ Page

Figure5. Process of Application making

That figure above shows the application process of ANUMS system where the left column shows the view of the display of application and the right column shows the source code of each

page of the application. That source code can be downloaded at https://github.com/Iinsilviya/Anums/tree/master/cobain2

3. RESULT AND DISCUSSION

3.1 Black Box Testing

Black-box testing examines the functionality of an application without peering into its internal structures or workings. This method of test can be applied to virtually every level of software testing: unit, integration, system and acceptance. The author will give an overview of how the result obtained through this system implemented in real condition. Below is the documentation of the system on the table 1.

Table 1. Black Box Testing

No.	Skenario	Test Case	Expectation	Result
1	Login Testing	Select the access right, input username andpassword.	System will be successfully, then lecturer can be logged in to the home page.	Valid
2	Unsuccessful Login	Input the wrong data or empty data	Lecturer can't be logged in	Valid
3	Download Form	Download the score form in excel file	The score form was successful to be downloaded and saved into lecturer's PC	Valid
4	Upload Form	Uploading score form from lecturer's PC	The score form was uploaded successfully and updated the student's score	Valid
5	Check and Print Form	Ensure student's score was inputted and print the student's score	The student's score was inputted it can be printed at that time	Valid

3.2 Questionnaire Testing

Testing ANUMS systems that use in this questionnaire should have used a comparison method wherein ANUMS system based desktop will be compared with ANUMS system based websites

with SPA. However, comparison between a desktop-basedof ANUMS application with a web-based of ANUMS applications is considered to be clearly distinguished, as will be mentioned by the author in the following chapter. In addition, the desktop-based application of ANUMS that currently used byUniversitasMuhammadiyahSurakarta not allowed to be used by the respondents. It is considering the limited access rights, which are only for the lecturers and staff of departments who can access the system. Thus, in this test is only done on a web-basedof ANUMS application with SPA that has been made by the author. This questionnaire will involve by five respondents to use a web-based of ANUMS application. Respondents were given five questions. Then, the respondents provide an assessment on each question with 1 for minimum score and 4 for maximum score. Answer 1 means very poor, 2 means less answer, an answer 3 is to say enough and 4 means good answer. Here are the results of the data of respondents who have tried ANUMS application based websites.

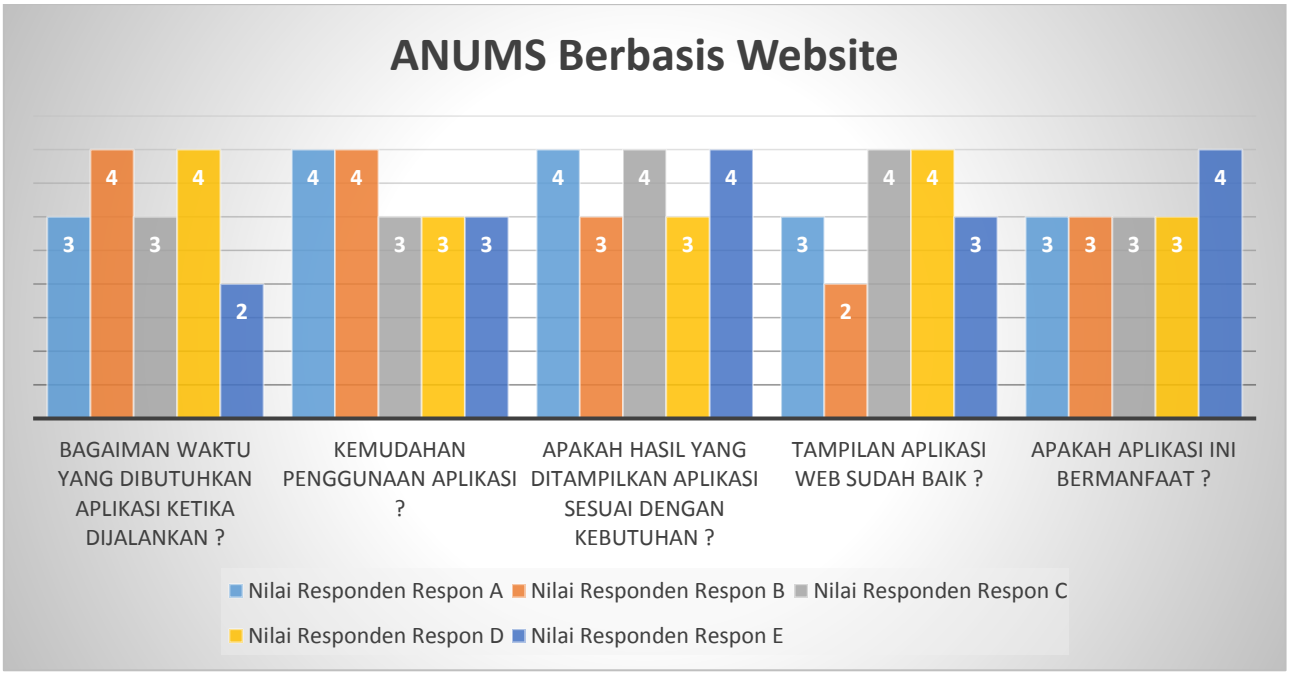


Figure 6. GrafikKuesionerpadasistem ANUMS berbasis website

3.3 Result

First, based on the black box testing that shown on the table above, it can be concluded that the ANUMS system based website with SPA has been worked. All the test that was done and validate to prove that the functionality of most activity can be handled by this system.

Second, the results intesting the feasibility of using a questionnaire on the application of web-based ANUMS applications can be seen from the graph above. The votes resultof web-based ANUMS applications with the SPA are. 1) Assessment of the web-based ANUMS application with

SPA in the category of ease of use application got 40% provides good value, 40% provide enough value, and 20% give less value. 2) in the category of ease of use application, 40% provide good value and 60% provide enough value. 3) the results displayed according to the needs of applications, 60% give good ratings and 40% give enough votes. 4) on the display got 40% of web applications provide a good value, 40% provide enough value and 20% give less value. 5) the categories of benefits got 80% provide enough value and 20% give good value.

3.4 Analysis

Both testing that has been done can be seen that the appearance of desktop-based ANUMS applications still very simple. Then, in terms of some functionalitiesstill limited. Some disadvantages of desktop-based of ANUMS applications is still used today, consists of 1) ANUMS Application-based desktop still limited by the hardware run. Where these applications could only run on computers only in the LAN network of UniversitasMuhammadiyah Surakarta. 2) ANUMS application-based desktop must first be installed on the operating system and the specific computer, and may have specific hardware requirements that must be met to ensure that the ANUMS application can run properly. 3) If the ANUMS application require a system update should be made directly to each computer that used by lecturers. So it takes a lot of time, money, and energy. The advantages of a desktop-based of ANUMS application compared with ANUMS application based website with SPA, it has security proved to be more powerful and have lower risk of hacking by the irresponsible people.

Web-based of ANUMS applications with SPA considered to rectify the shortcomings of the previous ANUMS system based desktop. Some considerations of ANUMS applications based website with SPA is able to improve the appearance and usability of the previous system, consists of. 1) ANUMS Application based website with SPA more reminiscent of web technology base, where static HTML pages and all the dynamic changes happening in the browser. 2) Lecturers can access the application using a web browser anytime and anywhere, it can be accessed using the Internet network, including storage and processing CPU power which allows for "thin client" (a machine with limited hardware capabilities) to provide an access to the complex application delivered from a centralized infrastructure. 3) SPA was proven to be faster, because most source HTML, CSS, and the script is only loaded once, only the data that is transmitted when the move without the need to reload the page to see on each page. Thus, reducing bandwidth usage. Besides that, there are several drawbacks of this application. 1) This application still have problem with excel file that was downloaded. The excel file have different format. It’s use old format. 2) This

application still have problem when importing file. 3) The excel file can't use the formula, because if this application use the formula it can ruin the result of excel file.

4. CONCLUSION

From these studies produced an ANUMS application based websitewith SPA that is better to increase the performance of services of the ANUMS system based desktop. In addition, the ANUMS system based website is able to answer the challenge of technological development that asks everything to be done fast-paced, easy, saving labor, time and costs. This was proofed by a study that said the application of Single Page Application (SPA) can save bandwidth and time because all the resources are imposed to access the system at the beginning and change according the response of the server on client interactions without refreshing the whole page (Jadhav et al., 2015). The advantages and disadvantages of web-based ANUMS applications with SPA consists of: a) it can handle the needs of lecturer's services more quickly and easily. b) the display more interesting and attractive. c) The use of applications easier than the previous application. While the lack of these applications include: a) It can't perform complex jobs. b) Lack of information resources to develop this application better.

ANUMS application based website with the use of the SPA which consists of six display which display the login, the main display, the viewing of 'Download Peserta', to see the 'UploadNilai' menu, the viewing of'Cek / CetakNilai' menu, and display the 'Ubah Password'menu. In testing the system using the method of comparison between the new system with the old system showed significant differences where the new system has more advantages than the old one.

4.1 Advice

Whenthis ANUMS system can be accessed by all active lecturer Universitas Muhammadiyah Surakarta, accessed data to be huge and might cause slow system to be accessed. In this case the data management and use of appropriate technologies can overcome these problems. In addition, the data that was accessed is very important and crucial. Therefore, the security of the system are

very important. For researchers who will come, the security level should be raised in order toassure data security.

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